

Experimental Data Summary: Example 2

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Table 2:

System type (Pure, Binary, Ternary, Reaction): Pure

Chemical System(s):

1-butyl-3-methylimidazolium tetrafluoroborate [bmim][BF₄]
1-hexyl-3-methylimidazolium tetrafluoroborate [hmim][BF₄]
1-butyl-3-methylpyridinium tetrafluoroborate [bmpyr][BF₄]
1-ethyl-3-methylimidazolium ethylsulfate [emim][EtSO₄]
1-butyl-3-methylimidazolium methylsulfate [bmim][MetSO₄]
1-butyl-3-methylimidazolium trifluoromethanesulfonate [bmim][triflate]
1-ethyl-3-methylimidazolium trifluoromethanesulfonate [emim][triflate]

Property: density

Experimental Method (be brief): vibrating tube densimeter

Combined Expanded Uncertainty ($k = 2$) for the Property: $2\sigma(\rho) = 0.1 \text{ kg/m}^3$

Variables and Constraints: temperature T , pressure p (1 atm)

Standard Uncertainty ($k = 1$) for each Variable and Constraint:

$\sigma(T) = 0.01 \text{ K}$; $\sigma(p) = 5\%$

Table: 3

System type (Pure, Binary, Ternary, Reaction): Pure

Chemical System(s):

1-butyl-3-methylimidazolium tetrafluoroborate [bmim][BF₄]
1-hexyl-3-methylimidazolium tetrafluoroborate [hmim][BF₄]
1-butyl-3-methylpyridinium tetrafluoroborate [bmpyr][BF₄]
1-ethyl-3-methylimidazolium ethylsulfate [emim][EtSO₄]
1-butyl-3-methylimidazolium methylsulfate [bmim][MetSO₄]
1-butyl-3-methylimidazolium trifluoromethanesulfonate [bmim][triflate]
1-ethyl-3-methylimidazolium trifluoromethanesulfonate [emim][triflate]

Property: isobaric heat capacity

Experimental Method (be brief): DSC

Combined Expanded Uncertainty ($k = 2$) for the Property: $2\sigma(C_p) = 0.3\%$

Variables and Constraints: temperature T , pressure p (1 atm)

Standard Uncertainty ($k = 1$) for each Variable and Constraint:

$\sigma(T) = 0.01 \text{ K}$; $\sigma(p) = 5\%$

Table: 4**System type (Pure, Binary, Ternary, Reaction):** Pure**Chemical System(s):**

1-butyl-3-methylimidazolium tetrafluoroborate [bmim][BF₄]
1-hexyl-3-methylimidazolium tetrafluoroborate [hmim][BF₄]
1-butyl-3-methylpyridinium tetrafluoroborate [bmpyr][BF₄]
1-ethyl-3-methylimidazolium ethylsulfate [emim][EtSO₄]
1-butyl-3-methylimidazolium methylsulfate [bmim][MetSO₄]
1-butyl-3-methylimidazolium trifluoromethanesulfonate [bmim][triflate]
1-ethyl-3-methylimidazolium trifluoromethanesulfonate [emim][triflate]

Property: speed of sound**Experimental Method (be brief):** pulse echo**Combined Expanded Uncertainty ($k = 2$) for the Property:** $2\sigma(u)$ = not given**Variables and Constraints:** temperature T , pressure p (1 atm)**Standard Uncertainty ($k = 1$) for each Variable and Constraint:** $\sigma(T) = 0.1$ K; $\sigma(p) = 5\%$

Table: 5**System type (Pure, Binary, Ternary, Reaction):** Binary**Chemical System(s):**

[hmim][BF₄] + ethanol
[bmpyr][BF₄] + ethanol
[emim][EtSO₄] + ethanol
[bmim][triflate] + ethanol
[emim][triflate] + ethanol

Property: excess enthalpy**Experimental Method (be brief):** Calvet microcalorimeter**Combined Expanded Uncertainty ($k = 2$) for the Property:** $2\sigma(H^E) = 4\%$ **Variables and Constraints:** temperature T , mole fraction x of the RTIL**Standard Uncertainty ($k = 1$) for each Variable and Constraint:** $\sigma(T) = 0.05$ K; $\sigma(x) = 0.0001$

Table: Supplementary Info SM1 to SM6**System type (Pure, Binary, Ternary, Reaction):** Binary**Chemical System(s):**

[bmim][BF₄] + ethanol
[hmim][BF₄] + ethanol
[bmpyr][BF₄] + ethanol
[emim][EtSO₄] + ethanol
[bmim][triflate] + ethanol
[emim][triflate] + ethanol

Property: density**Experimental Method (be brief):** vibrating tube densimeter**Combined Expanded Uncertainty ($k = 2$) for the Property:** $2\sigma(\rho) = 0.1$ kg/m³**Variables and Constraints:** temperature T , pressure p (1 atm)**Standard Uncertainty ($k = 1$) for each Variable and Constraint:** $\sigma(T) = 0.01$ K; $\sigma(x) = 0.0001$; $\sigma(p) = 5\%$

Table: Supplementary Info SM7 to SM12

Chemical System(s):

[bmim][BF₄] + ethanol
[hmim][BF₄] + ethanol
[bmpyr][BF₄] + ethanol
[emim][EtSO₄] + ethanol
[bmim][triflate] + ethanol
[emim][triflate] + ethanol

Property: isobaric heat capacity

Experimental Method (be brief): DSC

Combined Expanded Uncertainty ($k = 2$) for the Property: $2\sigma(C_p) = 0.3\%$

Variables and Constraints: temperature T , mole fraction x , pressure p (1 atm)

Standard Uncertainty ($k = 1$) for each Variable and Constraint:

$\sigma(T) = 0.01$ K; $\sigma(x) = 0.0001$; $\sigma(p) = 5\%$

Location of the Data in the Manuscript: